



Ozone Monitoring

Background

Ozone (O₃) is both a natural and a man-made product that occurs in the Earth's upper atmosphere (the stratosphere) and lower atmosphere (the troposphere). Stratospheric ozone is formed naturally through the interaction of solar ultraviolet radiation with oxygen. Tropospheric ozone – what we breathe – is formed primarily from photochemical reactions between two major classes of air pollutants, volatile organic compounds (VOC) and nitrogen oxides (NO_x). These reactions depend upon the presence of heat and sunlight, resulting in higher ambient ozone concentrations in summer months. The complexity of the reactions and the amount of time needed to complete them can result in the buildup of ground-level ozone concentrations far downwind from the original source. Significant sources of VOC are chemical plants and gasoline pumps while significant sources of nitrogen oxides are power plants and motor vehicles.

Long-term Monitoring

Ozone is one of the EPA's six principal pollutants that it has set National Ambient Air Quality Standards (NAAQS) for. NAAQS are designated as either primary or secondary; primary are designed to protect public health, while secondary are designed to protect agriculture and building structures. The

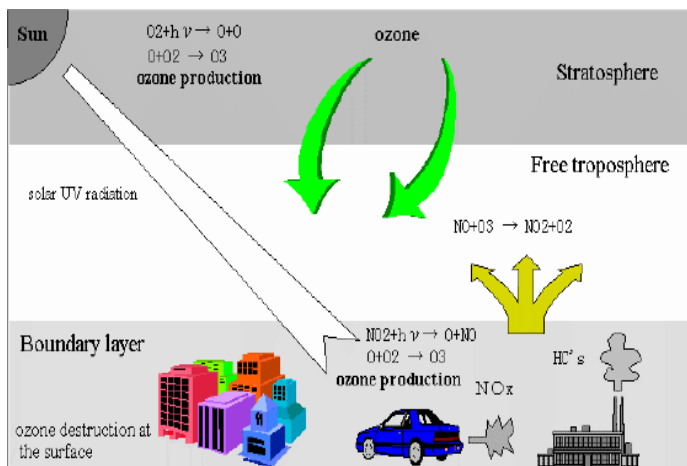


Figure 1. Ground-level ozone formation

current primary and secondary NAAQS for ozone is 75ppb (0.075ppm) averaged over 8 hours. An ozone exceedance occurs when an 8-hour averaged value is greater than 750ppb. CACO had four ozone exceedances during the 2010 monitoring season, which translates into serious health and environmental risks. Ground-level O₃ is a respiratory irritant and can reduce lung function and resistance to infection. CACO Interpretive staff posts human health advisories daily at the Salt Pond Visitor Center during ozone season. Environmentally, ground-level O₃ is also toxic to vegetation, inhibiting growth and causing leaf damage. As an environmental stressor, ozone can reduce the ability of sensitive plant species to withstand additional climate change related stresses such as increased pest infestations.

Table 1. CACO had four ozone exceedances during the 2010 monitoring season.

	2010	8-HOUR >.075 ppm	1-HOUR MAX (ppm) for the day
DATE	SITE		
June 24, 2010	Truro	.086	.103
July 17, 2010	Truro	.079	.096
August 31, 2010	Truro	.079	.097
September 2, 2010	Truro	.078	.082

Management Applications

The cumulative exposure to high ozone concentrations, for human and environmental health reasons, is important to continue to monitor at CACO. Ecological stressors brought about by climate change will need to be monitored closely in order to document and understand the degree and extent of damage to sensitive plant species at CACO.

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